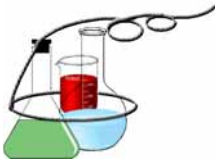

Idaho Chemical Roundup
Formaldehyde and Formalin

Formaldehyde and Formalin

Formaldehyde solutions provide immediate fixation of biological specimens and outstanding preservation while maintaining natural flexibility. The smell of formaldehyde was once the signature of biology departments everywhere. However, formaldehyde and formalin (a formaldehyde solution buffered with methanol) is now known to be a carcinogen and a severe respiratory irritant. It may still be present in significant quantities in some classrooms, especially in older specimen jars.

Quick facts

- ✓ The most common form of formaldehyde found in schools is formalin. Formalin is a 37% solution of formaldehyde, mixed with methanol and water. In schools, it is used as a fixative to preserve tissue samples and is typically diluted with water to a 10% solution. This diluted form is made from the 37% solution, and therefore contains 3.7% formaldehyde. Occasionally, stronger concentrations may be found.

- ✓ Though supply companies have reduced the amount of formalin used in the fixation process, it is often still present in the specimen samples.

- ✓ Some supply companies offer formalin-free specimens. While these specimens are more costly, they do completely eliminate the use of formalin in any of the processes.

- ✓ Formalin-free holding solutions can be purchased from supply catalogs. This eliminates the risk of formalin spills and vapor releases, but doesn't mean the specimen is formalin free.

- ✓ Formaldehyde and formalin vapors are dangerous to human health.
  - The Occupational Safety and Health Administration (OSHA) maximum exposure limit is 0.75 parts per million (ppm) in eight hours for an adult worker.
  - The National Institute for Occupational Safety and Health (NIOSH) established 0.1 ppm as the maximum permissible amount of exposure for any amount of time due to cancer risks.
  - If you can smell formaldehyde or formalin, you are over both the OSHA and NIOSH limits.
  - Due to children's higher sensitivity, take extra precautions to prevent children's contact with formalin.

- ✓ Proper ventilation is critical when formaldehyde/formalin is present.
  - Formaldehyde/formalin vapors are heavier than air and consequently will remain close to the ground.
  - Most school ventilation systems are located on the ceiling. Ceiling mounted ventilation is normally inadequate to handle formaldehyde/formalin vapors.
  - A chemical fume hood can provide the necessary ventilation.

- ✓ The school's chemical hygiene plan should address formaldehyde/formalin use, storage, and disposal, as well as provisions for purchasing safer alternatives.

Disposal considerations

Unused formaldehyde is a listed hazardous waste (U-122). Depending on the concentration, unused and spent formalin may be considered a hazardous waste due to ignitability. Typically, a 37% formalin solution should have a flash point below 140 degrees Fahrenheit and is considered hazardous. In general, a 10% diluted solution should have a flash point above 140 degrees Fahrenheit and therefore will not classify as a hazardous waste. The hazardous nature can be affected by the presence of other chemicals or contaminants. It is the responsibility of the school to individually evaluate its chemical wastes and determine if they are

hazardous. Hazardous wastes are subject to state regulations that affect disposal options. (See information sheet entitled, *Waste Management and Disposal at Schools*.)

Best practices suggest formaldehyde and formalin, regardless of concentration, be disposed of as hazardous wastes through a hazardous waste management company.

However, if your school is a conditionally exempt small quantity generator or if the concentration of formaldehyde/formalin is low (commonly less than 10%) it may be allowable to dispose of the wastes down the drain if several conditions are met:

- Check to see that drains discharge to a publicly owned treatment works (POTW) and obtain permission from the POTW operator to ensure the facility will accept formaldehyde solutions.
- Never discharge any formaldehyde solution into a septic system or wastewater system other than a POTW. It can interfere with the operation of the system and may be illegal.
- Consider treating the solution prior to disposal. Many supply companies offer products that neutralize the hazardous nature of the formaldehyde/formalin.
- Contact DEQ with any questions or concerns (see numbers below).

For specimens preserved in formaldehyde/formalin, check with your local landfill for special disposal requirements and double bag specimens prior to disposal.

Other tips for formaldehyde/formalin

- Label all containers containing formaldehyde or formalin.
- Ensure all seals on formaldehyde or formalin are intact and secure. Electrical tape, silicone, or wax can be used to help protect against accidental vapor releases.
- Insist on receiving material safety data sheets (MSDS) for any specimen in your classroom. The MSDS contains additional information about the potential hazards of your specimens.
- Track inventory and expiration dates. One way to reduce the risk of formaldehyde and formalin in the science laboratory is to have an accurate inventory. Once the inventory is established, monitor the expiration dates to ensure no additional hazards develop in the laboratory.

For more information

For information on formaldehyde solutions in schools, view *A Case Study of Environmental, Health & Safety Issues Involving the Burlington, Massachusetts Public School System* at www.epa.gov/Region7/education_resources/teachers/ehsstudy/index.htm.

For more information on worker exposure limits, view the *NIOSH Pocket Guide to Chemical Hazards* at http://www.cdc.gov/niosh/npg/npg.html.

For information about hazardous waste requirements, contact the Department of Environmental Quality at (208) 373-0502 or visit www.deq.idaho.gov. Contact your local DEQ regional office at:

Boise	373-0550
Coeur d'Alene	769-1422
Idaho Falls	528-2650
Lewiston	799-4370
Pocatello	236-6160
Twin Falls	736-2190